

CLAIMS

1. A data product that can be read into a computer or a map data processing apparatus and contains map data that includes map-related information related to a map, the map
5 data comprising:

a structure achieved by dividing the map into a plurality of mesh-like subdivisions and dividing the map-related information into units corresponding to the individual subdivisions; and

10 a structure in which the map-related information is managed in units of subdivision sets each containing a plurality of adjacent subdivisions and the map-related information is used in the map data processing apparatus in units of the individual subdivision sets.

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2. A data product according to claim 1, wherein:

the subdivision sets are each constituted with a core portion having at least one subdivision that does not overlap with another subdivision set and an overlap portion having
20 at least one subdivision that is part of a core portion of another subdivision set.

3. A data product according to claim 1 or claim 2, wherein:

the map-related information corresponding to the
25 overlap portion is generated by reducing the map-related

information corresponding to the core portion of the other subdivision set.

4. A data product according to any of claims 1 through 3,
5 wherein:

the map-related information corresponding to each of the subdivision sets is continuously recorded on a recording medium as a single block of information.

10 5. A data product according to any of claims 1 through 4, wherein:

the map-related information adopts a structure that allows the map-related information to be used in the map data processing apparatus also in units of the individual
15 subdivisions.

6. A data product according to any of claims 1 through 5, the map data further comprising:

a structure that contains management information used
20 to manage the map-related information in units of the subdivision sets, wherein:

the map-related information obtained by the map data processing apparatus can be updated in units of the subdivision sets by using the management information.

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7. A data product according to any of claims 1 through 6,
wherein:

the map-related information is route-related
information related to routes on the map used for route
5 calculation.

8. A data product according to claim 3, wherein:

the map-related information is route-related
information related to routes on the map used for route
10 calculation;

intersection points of roads are designated as nodes;

the route-related information comprises sets of
subject node information each corresponding to one of a
plurality of nodes present on each road and sets of adjacent
15 node information corresponding to nodes connecting with
individual subject nodes;

the route-related information corresponding to the
core portion comprises the subject node information and the
adjacent node information; and

20 the map route-related information corresponding to the
overlap portion is generated by eliminating the adjacent node
information corresponding to specific nodes from the map
route-related information corresponding to the core portion.

9. A data product that can be read into a computer or a map data processing apparatus and contains map data that includes map-related information related to a map, the map data comprising:

5 a structure achieved by dividing the map into a plurality of mesh-like subdivisions and dividing the map-related information into units corresponding to the individual subdivisions; and

a structure in which the map-related information is
10 managed in units of subdivision sets each containing a plurality of adjacent subdivisions and the map-related information is used in the map data processing apparatus in units of the individual subdivision sets, wherein:

the subdivision sets are each constituted with a first
15 subdivision and at least one subdivision adjacent to the first subdivision;

map-related information corresponding to the first subdivision comprises the map-related information having been divided; and

20 map-related information corresponding to the subdivision adjacent to the first subdivision comprises information generated by reducing the map-related information having been divided.

10. A data product according to any of claims 1 through 6 and 9, embodied as a recording medium having recorded therein the map data.
- 5 11. A data product according to claim 7 or 8, embodied as a recording medium having recorded therein the map data.
12. A map data processing apparatus comprising;
a recording medium drive unit at which a recording
10 medium embodying a data product according to claim 10 or 11 is loaded; and
a processing unit that executes map data processing based upon the map data recorded in the recording medium.
- 15 13. A map data processing apparatus comprising;
a recording medium drive unit at which a recording medium embodying a data product according to claim 11 is loaded; and
a processing unit that executes a route calculation
20 based upon the route-related information recorded in the recording medium.
14. A data product that can be read into a computer or a map data processing apparatus and contains map data that

includes map-related information related to a map, the map data comprising:

a structure in which the map-related information is provided at a plurality of levels each corresponding to one
5 of various scaling factors;

a structure achieved by dividing the map into a plurality of mesh-like subdivisions and dividing the map-related information divided into units corresponding to the individual subdivisions, at each level;

10 a structure in which the map-related information is managed in units of subdivision sets each containing a plurality of adjacent subdivisions and the map-related information is used in the map data processing apparatus in units of the individual subdivision sets; and

15 a structure in which management tables containing information used to manage the subdivision sets at the individual levels are provided, wherein:

the management tables contain information used in an arithmetic operation executed to determine correspondence
20 between subdivision sets at different levels.

15. A data product according to claim 14, wherein:

the management tables each contain information indicating a position of a reference subdivision
25 representing a given subdivision set in combination with

information related to a quantity of subdivisions contained
in the subdivision set along a vertical direction and
information related to a quantity of subdivisions contained
in the subdivision set along the horizontal direction.

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16. A data product according to claim 15, wherein:
the subdivision set has a rectangular shape; and
the reference subdivision representing the
subdivision set is a subdivision located at a lower left
10 position in the subdivision set.

17. A data product according to claim 16, wherein:
sets of the information used to manage the subdivision
sets are stored sequentially in an order corresponding to a
15 positional arrangement of reference subdivisions
representing the individual subdivision sets in reference to
the horizontal direction and the vertical direction along
which the map is divided.

20 18. A data product according to any of claims 14 through
17, wherein:
the map is divided into a plurality of mesh-like blocks
at each of the levels;

the plurality of subdivisions are subdivisions obtained by further dividing each of the blocks into smaller partitions; and

the management tables are provided each in
5 correspondence to one of the blocks.

19. A data product according to any of claims 14 through 18, wherein:

the map-related information obtained by the map data
10 processing apparatus can be updated in units of the individual subdivision sets by using the management tables.

20. A data product according to any of claims 14 through 19, wherein:

15 intersection points of roads on the map are designated as nodes;

the map-related information contains information related to the nodes;

the map-related information divided in correspondence
20 to each subdivision unit further contains different level node correspondence information indicating correspondence between nodes in the subdivision and corresponding nodes at another level; and

the correspondence between nodes at different levels
25 can be ascertained based upon correspondence between the

subdivision set and a subdivision set at the other level and the different level node correspondence information for subdivisions constituting the subdivision set.

- 5 21. A data product according to any of claims 14 through 20, wherein:

 the map-related information is route-related information related to routes on the map used for a route calculation.

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22. A data product according to any of claims 14 through 20, embodied as a recording medium having recorded therein the map data.

- 15 23. A data product according to claim 21, embodied as a recording medium having recorded therein the map data.

24. A map data processing apparatus comprising:

 a recording medium drive unit at which a recording
20 medium embodying a data product according to claim 22 or claim 23 is loaded; and

 a processing unit that executes map data processing based upon the map data recorded in the recording medium.

- 25 25. A map data processing apparatus comprising:

a recording medium drive unit at which a recording medium embodying a data product according to claim 23 is loaded; and

a processing unit that executes a route calculation
5 based upon the map route-related information recorded in the recording medium.